

20

## INFORMATION REPORT INFORMATION REPORT

## CENTRAL INTELLIGENCE AGENCY

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COUNTRY East Germany

REPORT

SUBJECT Construction Program of Seven-Year  
Plan of the East German Electric  
Power Industry

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report

concerning the construction program of the seven-year plan for the electric power industry in East Germany. The following topics are included in the contents: position of the industry in the economy; estimate of the present technical and economic situation of the industry; main tasks of the plan up to 1965; measures for implementing the plan up to 1965; advantages of the proposed measures and appropriations for them.

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INFORMATION REPORT INFORMATION REPORT

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# WASHINGTON ONLY

## Reconstruction Programme for the Electric Power Industry

### Contents

1. The economic position of the industry
2. Estimate of the present technical and economic situation in the industry
3. The main tasks of the prospective plan up to 1965 in the industry
4. Reconstruction measures for ensuring that the tasks of the plan for the industry up to 1965 are carried out
  - 4.1 Measures for development and introduction of new products
  - 4.2 Measures for specialisation, concentration and centralisation of production
  - 4.3 Measures for changing production technique and administration
5. Advantages of the proposed reconstruction measures and funds for implementing them.

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**SECRET**

**SECRET CONTROL  
& S. OFFICIALS ONLY** 9858

**SECRET**

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**1. The economic position of the industry**

In a highly developed economy like that of the D.D.R. continual increase in power production forms the decisive basis for the growth of industrial production and raising of the standard of living for the population;

"Soviet power plus electrification equals Communism"

This formula of Lenin's provides the basis for the extraordinary importance of electric power in the building of socialism in the D.D.R. One of the main tasks is production of electric power by means of thermal, pump-fed and hydro-electric power stations. In the D.D.R., over 90 % of the power is produced in thermal power stations, the largest amount from coal, especially lignite. As the total number of thermal power stations increases in relation to hydro-electric power stations, oil will be used to an increasing extent as fuel instead of coal in future, until 1966, when after experimental power plants have been tested, the atom will gain in importance as a source of power.

The power machine construction industry provides the most important mechanical equipment for expansion and maintenance of power plant capacity. The development of capacity for producing power also demands a corresponding increase in production of machinery for the industry within the framework of the proportional development of the national economy, and this must be in principle greater than in the other branches of the heavy machinery industry. In view of the destination and material importance of its products and considering the labour situation in the D.D.R., the power machine construction industry must combine its increase in production with a constant improvement in efficiency and a reduction in specific weight of its products, as well as a considerable rise in productivity.

The socialist reconstruction programme for the industry is directed to this end.

**2. Estimate of the present technological and economic situation in the industry**

Up to 1945 the power machine construction industry of imperialist Germany was overwhelmingly concentrated in the West of the country, above all in North Rhine/Westphalia. The relatively unimportant production centres on the territory of the present D.D.R. were mostly destroyed after

**SECRET**

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25X1

**SECRET**

- 2 -

1945 as a result of the war.

In the past ten years, a socialist power machine construction industry has been started in the D.D.R. as a result of government direction and the efforts of those working in the industry, and is now in a position to cover the rapidly growing requirements for power station equipment in essentials at least.

## 2.01 Present extent and technical position in production

The actual production branches of the power machine construction industry consist of production and assembling of steam generators, turbines, water purification plant and piping.

78.9 % of the production in these lines is at present concentrated in the VVB power machine construction industry. This relatively high degree of administrative concentration is in conformity with the essential intention of the power machine construction industry, in which distinctions are made between individual production. The share of VVB power machine construction in the D.D.R. production consists of:

Steam generators	79.6 %
Turbines	99.6 %
Water purification plant	87.2 %
Piping	60.6 %

The proportion taken up by these principal products in the 1958 gross production of the VVB power machine construction industry amounted to 53.5 %.

Assembling of the principal products amounted to 18.6 % of the total gross production and generator construction to 4.0 %.

Deliveries of principal products are included in the remaining 23.9 % of production, in so far as they have been established.

In 1958 steam generators with a total output of 3654 t/h of steam and to the value of 110.1 Mil. DM., including those from works not coming under the VVB power machine construction industry, were produced in the D.D.R.

The largest units in steam generator construction at present reach an individual output of 240 t/h of steam with an authorised pressure of 132 atu at 500°C. The construction plan of the steam generator is based mainly on

**SECRET**

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25X1

**SECRET**

- 3 -

brown coal as fuel, with a heating value of about 1700 "kcal" so a comparison of degree of effectiveness with other countries is not possible since as a rule fuels of higher heating value are in use. The present technical position in steam generator construction corresponds roughly to that existing in Czechoslovakia, but is not on the same level as the U.S.S.R.,

[redacted] It should in particular be noted that 25X1  
development of the forced-circulation steam generator, and of cyclonic heating are very much behindhand.

In 1958 turbine construction reached a production level of 503.6 MW, with a value of 50,5 Mil. DM.

[redacted] steam turbines up to 5 MW output are 25X1  
treated as driving engines for generators, pumps and ventilators, and those with output up to 50 MW and up to 110 ata and 485°C are for industrial and base-load power stations. In addition, the first gas turbine 4500 HP installations for ships, and 4000 HP installations for static purposes were produced. Water turbines are produced in very small quantity in the D.D.R., [redacted] 25X1

The technical standard in turbine construction is about equal to that of Czechoslovakia, but below that of the U.S.S.R. [redacted] 25X1

Production of chemical and thermal water purification plant amounted to 30.5 Mil. DM in 1958.

The plant produced is in accordance with world standards, with the exception of automatic adjustment apparatus for low head and moderate head hydro-electric plant, safety devices, and automatic regulation for high-pressure preheaters. The problem of complete desalting is so near to a solution that industrial application can be followed up.

The importance of pipe-line construction, total value of which in 1958 was 75.9 Mil. DM, for expansion of power plant, for the chemical industry and gas supply has in the past been underestimated, and this is seen in the small degree of administrative concentration on this type of production. The technical stage reached in pipe-line construction, as regards both laying and manufacture, is in accordance with the requirements arising from the capacity and parameter of steam generators.

**SECRET**

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**SECRET**

- 4 -

**2.02. Present market structure of the industry**

[ ] the production level of this industry is 25X1  
determined above all by [ ] the proportion amounting in  
1958 to 57.5 %. In addition, power machine construction has since 1955  
been in a position to export power plant in greater quantity, for which the  
VVB power plant export department is at the disposal of the industry for  
planning, co-ordination and assembling. Export is concentrated mainly on  
the Chinese Peoples' Republic, [ ] and for small industrial power 25X1  
plant and individual units, the European Peoples' Democracies.

The part played by the chemical programme in production of power plant  
machinery is at present still very small, since technical requirements  
have not yet been finally defined and put into commission.

It is worth remarking that the technical output of products and plant  
from the industry has so far been almost exclusively according to customers'  
wishes. Therefore the maximum attention has been paid to the varying  
investment proportions, but the conditions for economic production have been  
seriously neglected owing to the warehouse programme associated with them.  
Steam generator construction supplies, in addition to the power programme  
and the export market, mainly small steam generators up to 12.5 t/h steam  
for heating purposes and plant up to 100 t/h steam output for steam supply  
in industry.

The [ ] export absorb turbine construction almost 25X1  
exclusively.

Complete drinking water purification plant for the Water Conservation  
Board is included in the existing requirements for water purification plant.

The market for pipe-line construction is split up among almost all  
customers in the D.D.R. [ ] and the export market. 25X1

**2.03 Present position in concentration and specialisation**

In contrast to the relatively high degree of administrative concentration  
in production of steam generators, turbines, water purification apparatus  
and pipe-lines, [ ] is very much 25X1  
split up among the individual concerns, especially where steam generators,  
water purification plant and, in particular, pipe-lines are concerned.  
The extent of present parallelism in production may be seen in Appendix 16.

**SECRET**/Steam generators.....<sup>9853</sup>

**SECRET**

Steam generators are now being made in 10 concerns, including small steam generators up to 12.5 t/h steam in 6 concerns, and large ones over 12.5 t/h steam in 8 works. 5 concerns are engaged in the production of heating plant and soot blowers, and their production  is not precisely laid down. As steam generators consist of a number of larger construction groups each making its own different demands on technology, inadequate concentration and specialisation in steam generator construction leads to a number of shortcomings which are a heavy burden on present productivity and profit.

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Since 1950, clear demarcation has existed in tasks according to output, under which steam turbines up to 5 MW are manufactured at the VEB Turbine Factory, Dresden, those from over 5 to 25 MW by the VEB Goerlitz Machine Construction Works, and those over 25 MW by the VEB Bergmann-Borsig Works. Apart from the fact that <sup>additional</sup> 3 concerns were temporarily employed in small turbine construction, of which the last, the VEB Elbe Works, Rossau, left the VEB Power machine construction again at the end of 1959, one private concern near Leipzig is turning out small quantities of turbines for pumps. Gas turbine manufacture is concentrated in the VEB Machine Construction Goerlitz and the specialised manufacture of assembly groups and single turbine parts was only dealt with in small quantities - at the VEB Turbine Factory in Dresden. Considerable reserves are in existence here for a rapid increase in productivity and profit in turbine construction.

At present 19 concerns are working in production of water purification plant, 4 of which are associated with the VEB power machine construction. In addition to the three concerns under other administration and ownership appointed by the VEB power machine construction for co-operation, the remaining 12 concerns are engaged in the manufacture of smaller plant of less economic importance. The production programme of the 4 concerns belonging to the VEB power machine construction is only delimited among them as a matter of form according to chemical and thermal plant. Since however a large quantity of the equipment and assembling plant of chemical and thermal water purification plant is similar or identical, productivity and profit in this branch of production can be increased considerably by specialisation according to equipment and assembling plant corresponding to the technical structure of the concerns.

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Pipe-line production in particular is very much split up, and this applies also to pipe-line assembly. Apart from pipe-line constructions outside the VVB which are at present unco-ordinated in their production and technical development, there is also, within the VEB power machine construction, the VEB pipe-line assembly<sup>works</sup>/at the Kari-Marx -Stadt working as an independent undertaking for laying long-distance pipe-lines, but it does not reach the extent of the corresponding assembling area in the VEB pipe line construction works at Bitterfeld. Concentration of production, together with intelligent specialisation is the starting point for increasing productivity and profits.

The capacity and productivity of the power machine construction industry are at present still hampered by the number of heterogeneous products turned out by the VVB power machine construction concerns. By shifting these items to the competent branches of industry, further reserves for improvement in production and economic activity in this branch have been released. This however does not apply to production of power station turbo-generators, since there is complete demarcation of tasks in production and technical respects, as compared with the electrical construction industry, and specialised production installations are available within the VVB power machine construction for this purpose.

2.04. Present proportion of individual and serial production in this branch of industry.

It has already been mentioned that no  set types 25X1 is used in this branch of industry; construction and installation are carried out on the basis of clients' special requirements. This fact, coupled with insufficient concentration and specialisation results in the extraordinarily high proportion of single-part production, amounting to 75.0 % of the total production in the industry.

This is shown in detail by the following survey:-

	Single-part production %	Small series production %	serial production %
VVB total including:	75.0 %	22.0 %	3.0 %
Steam generator construction	82.0	18.0	-
Turbine and generator construction	70.0	25.0	5.0

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**SECRET**

	Single-part production %	Small series production %	Serial production %
Water purification plant construction	95.0	5.0	-
Pipe line construction	60.0	32.0	8.0

The high proportion of single-part production is also responsible for the exceedingly high over-loading of sections dealing with preliminary work, particularly construction, technology and supply of materials.

#### 2.05 Current state of means of production

According to the October 1955 figures, the following survey states the quality and life of industrial machine tools:

Quality	%	Duration	%
I	11.0	up to 5 years	27.0
II	24.0	5 - 10 "	16.0
III	40.0	11 - 20 "	20.0
IV	25.0	over 20 "	37.0

The average degree of efficiency of all machine tools in the industry is 2.79, and the average working life 14.0 years.

This position was not likely to alter greatly in the next few years, i.e. up to 1958. The detailed survey is submitted up to 31.7.59.

When assessing the condition of means of production, the varying technological structure in individual branches must be taken into consideration. Thus, equipment in steam generator, water purification plant and pipe-line construction is mainly restricted to welding apparatus, plate-bending and pipe-bending machines, while equipment in turbine and generator construction consists principally of machine tools.

The determining factor for capacity of steam generator, water purification plant and pipe-line construction concerns is not the available equipment, but rather the production space. With proper organisation of production space in these branches it is quite possible to forego new investment in ordinary machine tools and provide these by conversion from turbine and generator construction. This would make it possible to concentrate all new investment in ordinary machine tools on turbine and generator construction, so that productivity could be considerably increased, whereas use of old machines would not have a damaging effect on productivity

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in concerns in the other branches of the industry.

## 2.06 Present exploitation of production methods

Owing to the high proportion of single part production caused by inadequate standardisation, concentration and specialisation, the loading of machines and installations in the industry is unequal,

	Shift coefficient	Exploitation of machines %	Exploitation of production space DM/sq.m.
VVB as a whole including	1.4	62.2	1 620
Steam generator construction	1.2	45.0	1 470
Turbine and generator construction	1.5	63.4	1 670
Water purification plant	1.4	48.6	1 100
Pipe-line construction	1.2	72.0	2 700

The low co-efficient of shift exploitation in steam generator and pipe-line construction is due to the high proportion of outside assembling. It must be taken into consideration that about 30 %  in both these production branches work on outside assembling.

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A similar situation exists in water purification plant construction.

In turbine and generator construction, the shortage of turners is hampering the efficiency of the shift system. Also, the lack of continuity in the rhythm of production affects all branches of industry, and through this regular manning of two shifts on an average is not at present possible. It must however be stressed that all machinery causing bottlenecks operates in three shifts.

The exploitation of equipment in individual production branches is an illustration of the proportion of single-part, small series and serial production.

## 2.07 Present position in production organisation and method

Production organisation and methods are also influenced by inadequate standardisation, concentration and specialisation, as well as by the high proportion of single-part production. With few exceptions, production is organised on the workshop principle.

A number of modern production processes such as automatic welding, necking and pressing out (charging) of batteries for "Pomastucke" (?)

# SECRET

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U. S. OFFICIALS ONLY

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- 9 -

(? remote control tools) rolling and drawing turbine blades, etc are being developed in power machine construction or adapted to the particular requirements of the industry, but are not being sufficiently exploited.

Comprehensive application of modern methods encounters difficulties owing to the splitting up of production, since valuable and costly machines and equipment are only profitable where production is on a large scale. This applies chiefly to pipe welding under protective gas, electric slag welding for heavy sheeting, U-section join welding, mandrel-less pipe-bending and testing high alloy-content material by means of radio-active isotopes.

Modern assembly methods which are in use in the Soviet Union are not being sufficiently exploited, particularly for steam generators and pipe lines. On the one hand conditions for planning and construction have not yet been created to the full extent; on the other, the necessary modern transport and assembling equipment are not available in sufficient quantity. Full use of this valuable equipment is in any case not guaranteed under the present splitting up of assembly plants.

The current stage of production techniques in turbines and generators is marked by insufficient application of machineless methods in blade production, and very infrequent application of welding technique for nozzle caps, draw-off casings and low pressure turbines and also by the high proportion of [redacted] assembling and generator construction; important reserves exist for increasing productivity.

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#### 2.08 Current state of manpower and personnel in industry

[redacted]

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The number of workers available for production has been adversely affected by the results of the second world war in that there are a great many in the higher age groups, and on the other hand a large proportion of young skilled workers who are as yet not adequately trained in production methods. This phenomenon is particularly marked in outside assembling and in workshop production of turbine construction, as both the highest technical qualifications and a strong physical constitution are required in this field.

**SECRET**

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# SECRET

Employment of personnel of high school and technical school education varies from branch to branch in the industry. It is highest in turbine and generator and in steam generator construction and lowest in water purification plant and pipe line installations. Here, too, previous underestimating in both these branches of production, particularly in training, becomes evident. In general, high school and technical personnel are concentrated in the planning and construction departments, and the number in technology and production management is totally inadequate. This originates in pay rates and the direction training has taken in high schools and technical schools. In addition, the needs of the last-named departments are underestimated in comparison with those of planning and construction departments.

In this context it must be confirmed that unity of political and moral views has been established in production concerns and in the FVAS Dresden, the future institute for power machine construction, between the former members of the bourgeois intelligentsia and the young high school and technical school graduates, whereas this unity has not yet been achieved in the central development and construction offices for steam generators and turbines and generators. This has an adverse effect not only inside the two central development and construction concerns mentioned, but also on technical development in steam generator construction and turbine and generator construction. Also, responsible members of working circles of the research council are mostly members of the former bourgeois intelligentsia and often hamper technical development because they put traditional and even selfish interests first. The VVB power machine construction has already taken ideological and organisational measures to end this situation as soon as possible.

## 2.09 The present state of organisation in industry

Management in industry is organised on the principles of socialist leadership. Last year, through the activity of a collective organisation group, concerns received instructions on organisation of their internal management structure. In spite of this, it has not so far been possible to put into practice uniform principles of organisation in all concerns to facilitate simplification of tasks and responsibilities and consequently

# SECRET

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**SECRET**

economise in unproductive personnel. This is also conditioned by the high proportion of single-part production in many different lines of product.

Individual management with collective consultation and association of workers in management has been brought about to varying degrees. Weaknesses exist above all in the middle cadres of management, i.e. departmental heads and foremen; this is due to insufficient qualifications and to over-centralisation of leading functions in administrative sections of concerns.

Chief contractors and leading concerns (Leitbetriebe) do not exist in the industry, with the exception of the central development and construction offices for steam generators and turbines, whose deficiencies have already been mentioned. Their inadequate leadership in the technical field becomes particularly evident in the fact that although working circles serve as a forum for discussions on technical differences of opinion, they only seldom submit concrete proposals and advice to the management of the VVB power machine construction.

In implementing the law of 11.2.1958 for improving and simplifying the work of the party machine, the VVB power machine construction undertook in 1958 a thorough analysis of its working and management methods and introduced a management structure which differs considerably from the arbitrary unified structure as laid down by the State Planning Commission early in 1958. However, this structure has required the elaboration of a new style of working in the VVB power machine construction, taking the form of complex cadre activity.

#### 2.10 Present state of productivity and profits

In spite of the shortcomings mentioned, power machine construction has not only achieved a considerable increase in output but also a significant increase in productivity and profits. The workers' productivity rate was increased to 280 % from 1950 to 1958. During the same period, the industry, which in 1950 still showed a loss of 1.2 million DM, raised its output to 45.6 m.DM. Productivity of the individual branches of power machine construction for 1958 was between DM 33,200 and 45,300. The part played by materials and deliveries is mainly responsible for these discrepancies.

Examination of industrial concerns not forming part of the VVB power machine construction has shown that in every case the centrally managed

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concerns achieve the highest productivity rate.

Further development demands that the VVB power construction machine concerns, with the aid of socialist reconstruction, should mobilise all previously mentioned reserves for increasing production and profits and at the same time - through a considerably increased exchange of experience - bring firms run under different administration and ownership up to the level of the centrally controlled socialist power machine construction.

### 3. Main tasks of the industrial programme up to 1965

On 11.10.1958 the VVB power machine construction received the directive for the 3rd Five Year Plan up to 1965, from the State Planning Commission; in its turn, the VVB power machine construction handed the main indices to the concerns in October 1958. During the 1959 discussions on industrial plans, the main indices of this plan were also the subject of discussion with officials of the concerns and organisations as well as with the confidential staff. Early in May 1959, the concerns received supplementary directives for working out the reconstruction programme and these were thoroughly discussed and worked out by specialist groups. In May 1959, the draft programmes of industrial reconstruction were discussed by the managing director and his deputy, together with specialists from the respective production branches, and many open questions were answered.

It can be established that those working in this branch of industry have taken an active part in working out the reconstruction programme. On the basis of measures laid down in the programme, the aims proposed by the State Planning Commission for the development of production and economic activity in the industry have been realised and exceeded,

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	Increase 65:58 as per SPK %	Increase 65:58 as per VVB %
Gross production, UPP	172.5	-
Raised on 16.5.59	191.0	194.0
Productivity per worker	195.5	200.0
Cost	66.8	66.8
Industrial result	578.0	810.0

In the above comparison, all double figures resulting from the position as regards chief contractors in 1961 and 1963 respectively in the indices

## SECRET

**SECRET CONTROL**  
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**SECRET**

- 13 -

and the following text have been separated so that the figures of the VVB power machine construction may be compared with the advance figures of the State Planning Commission.

[redacted] the gross production of the 25X1  
VVB power machine construction, particularly in the years up to 1962,  
considerably exceeds that forecast by the State Planning Commission on [redacted] 25X1  
and [redacted] This is mainly owing to the irregular increase in requirement  
for the power programme, oil pipe line and diesel engine programme.

[redacted] 25X1  
[redacted]  
The long-term character of production of steam  
generators and turbines requires a corresponding co-ordination of factory  
production from 1960 to 1962. In the same years, production of pipes for  
oil pipe lines and of power-driven machinery for the diesel locomotive  
[redacted] is increasing rapidly. 25X1

In view of the large share of [redacted] oil pipe lines and current- 25X1  
driven machinery in the total production of the power machine construction  
industry, as shown in appendices 3 and 4, concentration of this requirement  
in the years 1960 to 1962 leads to a considerable speed-up of production  
development when contrasted with the advance figures of the State Planning  
Commission.

[redacted] 25X1  
[redacted]  
As a result, due to the long-term nature of steam generator and  
turbine construction, workshop production is not covered by provision made  
and the VVB power machine construction has therefore decreed an increase for  
the years from 1963 onwards which will gradually slow down. It is assumed  
that the balance of work can be guaranteed by corresponding co-operation  
for the period after 1965. For necessary progress in constructive,  
technological and material supply preparation of workshop production from  
1963, it is however desirable that the advance plan [redacted] 25X1  
for the period after 1965 should be available by the end of 1960 and that  
the corresponding projects should be ready by 1961 at latest.

**SECRET**

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Only on this condition can the further increase in production projected by the VVB power machine construction from 1963 onwards be sustained and the continued development of power station capacity guaranteed. Capacity in pipe-line construction can be assured after completion of the oil pipe line<sup>in</sup>/1963 by taking over and concentration of production of welded plate pipe lines from the former splinter concerns. In this way capacity will be released for other work in these concerns. In addition, from 1963/64 onwards, a considerable increase in the requirements for the chemical industry programme is expected.

The necessity for production development by leaps and bounds in 1960 - 1962 in order to guarantee the state programmes presents the power machine industry with a series of problems regarding production and capacity.

In agreement with the industrial workers, the VVB power machine construction has laid down that the increase in productivity in 1960/61 must be speeded up so much that already in 1961 the provision of the State Planning Commission for 1962 will be overtaken but it cannot prevent the proposed number of workers being slightly exceeded in 1961 and 1962. From 1963, the excess of production workers will be balanced by additional economy in the rest of the personnel in production concerns and other establishments. Thus the increase forecast up to 1965 will be overtaken, the individual branches of the power machine construction increasing their productivity between 174.2 % and 228.5 %, as shown in appendices 11 and 12.

In order to guarantee the necessary capacity for the leap ahead in production development, the VVB power machine construction failed, in spite of the greatest possible efforts, to prevent the investment sums forecast for the 1960/65 period from being exceeded in 1960 and 1961.

It should however be mentioned in this connection that owing to the stepped-up production development and the increase in productivity, the accumulation projected by the State Planning Commission will be considerably surpassed, [ ] The basis of investment is shown by 25X1  
a structure involving all projects over 50.0 (sic) TDM [ ] 25X1

Unless the measures laid down for reconstruction, contents of which are given in the following paragraphs, are implemented, the industry cannot achieve its planned aims, and the state production programme fulfilment will be held up.

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4. Measures of reconstruction for the safeguarding of the main objectives of the plan in perspective for industry up to 1965.

The basis of measures of reconstruction in industry lies in the concentration of production, hitherto to a large extent dispersed in separate concerns with individual industrial activities, into large socialist industrial plants with line and series production systems. The concentration of research and development work upon the main objectives of production and the far-reaching and comprehensive standardisation of products are an essential pre-requisite for the carrying out of this basic task. It is moreover of extreme importance that this reconstruction is considered not only as a technical process, but also that together with the development of our industries into socialist industries, at the same time a process of re-education in thought should take place among our industrial workers, especially among the technical intelligentsia.

## 4.1 Measures for development and introduction of new items in production

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### 4.10 Research and development

The tasks of research and development, as well as of standardisation, are determined essentially by the equipment, in set units or otherwise, to be delivered by the power machine construction industry within the framework of the Seven-year Plan. The prospective development of the most varied types of power plant is of decisive influence in this respect.

Distinction should be made between the following:-

Steam power plant for base- and medium-load  
Gas turbine power plant for peak-load  
Atomic power plant  
Hydro-electric power plant, and power plant with facilities for pumping to storage

### 4.101 Perspective of various types of power plant

Steam power plant: there are the following objectives:

Reduction of building costs per installed KW  
reduction of fuel consumption per kWh produced  
reduction of maintenance and upkeep costs per kWh produced  
increase of degree of availability and of reliability in operation  
shortening of times for putting into and out of operation of power plant for medium-load and peak-load power

In accordance with the conditions obtaining in the power industry of the D.D.R., the best possible solution of technical and economic problems must be achieved for further development, based on national and international experience and comprehensive research work.

# SECRET

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# SECRET

- 16 -

Objectives are as follows:

Raising of live steam pressure and live steam temperature

Coupling of steam turbine and gas turbine cycle processes

Shortening of times for putting into and out of operation of the boiler-turbine unit

Full automatic control of starting process and running operation

## Gas turbine installation

The possibility of economical introduction of gas turbine installation arises out of their specific qualities, such as:

Low cost of installation

Speed in starting

Small number of auxiliary appliances needed as compared with steam power plant

Small requirements as regards cooling water

Simplified attendance and maintenance

The limit of output attainable is about 50 MW, which applies only to the use of liquid or gaseous fuel in open gas turbine installations. Under the conditions obtaining in the D.D.R., gas turbine installations could be employed:

In peak-load power plant: on the basis of information obtained at a 3,000 kW experimental installation at Lauchhammer, a 25 MW-aggregate is now being developed which will be put into operation from 1963 in peak-load power plants. The same installation can furthermore be employed:

in industrial power plants, in the production from base-load in the use of cheaper gaseous or liquid fuel; e.g. in the utilisation of waste heat.

in thermal power stations

as coupling/transmission(?) installations:  
in steam power plants for improvement in economy

as practical and easily transportable power plant in the utilisation of the products of development from light gas turbine plant (3300 or 1600 kW power)

## Atomic power plant

The production of electrical energy from conventional types of fuel in the D.D.R. will in the foreseeable future no longer be sufficient, and the erection of atomic power stations will therefore become urgent. The construction of power machinery must thus tackle the problems before it sooner and more forcibly than hitherto. The following factors however act as a hindrance:

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**SECRET**

- 17 -

lack of co-operation between all departments concerned in the construction of nuclear power plant

uncertainty regarding further plans for the construction of nuclear power plant in the D.D.R.

failure to set objectives before the power machine construction industry as regards development, construction and production of equipment

lack of a responsible department within the power machine construction industry for coordination of all questions arising out of building of power plants.

Consequently in the plan of objectives now under consideration only very incomplete proposals for the efficient equipment of nuclear power plant could be accepted.

Hydraulic power plant and power plant with facilities for pumping to storage

The geological and hydrological conditions in the D.D.R. do not permit the use of water power to any great extent. In view of this fact the further construction of water turbines of small or medium power and even the development of larger water turbines does not seem to be economical.

The hydraulic installations of plant for pumping to storage have up to now been imported, and for the future there is no intention of carrying<sup>out</sup> any further developments. If occasion arises certain research work may be carried out in some branches within the international agreement of the council for mutual economic aid.

4.102 Prospects in principle equipment

Steam generators:

The development in construction of steam generators for the period 1960 to 1965 is marked by the following specifications agreed for the construction of steam power plant:

Natural circulation boilers for a steam pressure of 350 t/h steam, 159 ata authorised pressure, 135 ata/530°C superheated steam temperature and simple intermediate superheating at 530°C, for the combustion of crude lignite rich in ballast. This steam generator is being put into operation for the first time at Lubbenau, II.

Forced-circulation boilers for a steam pressure of 350 t/h, 194 ata authorised pressure, 176 ata/530°C superheated steam temperature and simple intermediate superheating at 530°C for the combustion of crude lignite rich in ballast.

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In addition to these main objectives other new constructions are becoming necessary, arising out of the fixing of stages of pressure, temperature and output at EKMN 70 004, and the specialisation in construction of the steam generator. For the course that these constructions will take the deciding factor is the power programme drawn up till 1965.

For elucidation of unsolved problems in boiler and furnace construction, the following important research work has been taken in hand, or is proposed:

Before putting the forced circulation boiler into operation (350 t/h steam, up to 176 ata, 530°C), two experimental installations:

50 t/h, 176 ata, 530°C  
100 t/h, 176 ata, 530°C

will be constructed and tested. Both steam generators will be equipped with injector mills (blowing devices) and fitted with electronic-hydraulic control; they will be erected in Bitterfeld.

On the basis of estimated oil imports from the U.S.S.R. and in addition to the existing rotary burners, oil pressure vaporizers for a rate of flow of 150 to 2500 kg/h will be developed, with reversible control.

For increased introduction of the cyclone furnace, especially for fuel rich in ballast (mineralised carbon, ash content = 12%) the fuels mentioned above will be tested in an experimental plant, 25 t/h steam, 19 ata.

Improvement in the efficiency of power plant by further raising of the steam parameter ( $T_1 = 565^\circ\text{C}$ ,  $p_1 = 176$  ata) requires comprehensive preparatory research work. For this purpose an experimental steam generator, 12.5 t/h steam for parameter up to 300 ata, 650°C will be built. The aim in view is to realise the use of fresh air temperatures of at least 565°C from 1965 onwards.

## Steam turbines and turbo-generators

Development in steam turbines and turbe-generators for the period from 1960 to 1965 is marked by the following main objectives:

100 MW steam turbine with triple casing, 127 ata, 525°C, with intermediate superheating

This turbine will be installed for the first time in 1961 at the works at Lubbenau II, and by 1965 there will be altogether 22 of them in the D.D.R.

Hydrogen-cooled generator, 125 NVA, 10.5 kV and  $\cos \phi = 0.9$ , 3000 min<sup>-1</sup>. This generator will be coupled with the above mentioned steam turbine.

New construction of various condensation, extractor-condensation and counterpressure-turbines in accordance with the IEC standard and the special requirements in industrial works and heating installations.

Further experiments in the technique of currents, resistance, oscillation, measuring and control, as research into basic principles and objectives, as well as tests on machines actually in use will further increase safety in operation and create a foundation for the technical improvement of the new construction which is planned.

The construction of air-cooled turbo-generators in series is to be revised in the light of accumulated experience, in which special attention

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must be devoted to increasing safety of operation, reducing weight, improving efficiency and starting speed.

Furthermore, in connection with the forced-circulation boiler, 350 t/h steam, the development of a 100 MW condensation-turbine with corresponding parameters is provided for.

### Gas turbine plant

The main tasks with regard to the development of gas turbine installations are the following:-

Development of a 25 MW-peak-load installation for fuel oil. Turbine inlet temperature 650°C.

Development of locomotive free-piston plant for 880 KW

Development of ship's installation of 2200 kW for the first FDGB tourist ship

Further research work which may assist the production of gas turbine installations up to 750°C inlet temperature, as well as preparatory work towards the use of higher temperatures.

Further basic research in the field of current, resistance and oscillation.

### Other current-producing machines

The development of current-producing machines, exhaust-driven turbo-superchargers and water turbines of small power are also within the scope of the VVB power machine construction.

The first current transmission machines for diesel locomotives with 150 - 600 HP power transmission were taken into zero series production in 1959. A further type of 1000 HP is in process of development; it will be put into zero series production in 1960.

The development of exhaust-driven turbo-superchargers, begun in 1952, led to construction of a series comprising 8 types, making possible charging of all diesel engines produced in the D.D.R. with a capacity greater than 90 HP. Further development is being continued by commissioned research.

Hydro-turbines are used in the D.D.R. only for local needs for utilisation of national water power. The extent of research, development and construction is therefore only small.

### Water purification plant

Both thermal and chemical water purification plant built in the D.D.R. conform to recognised world standards. The development of complete de-salting of boiler feed water and of brackish water has progressed so far that a beginning may be made with broad industrial application. Only

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**SECRET**

where mixed bed filters are concerned must development be speeded up still more. In accordance with instructions issued by <sup>the</sup> steam generator construction industry with regard to boiler feed water, the requirements of all plant included in the power programme in the shape of water processing can be met.

Pipe line installations

Demands made upon constructors of pipe-line installations for thermal power plants are determined by the specifications of steam generators. The performance data and parameter of the steam generators to be constructed under the seven-year plan are controlled by the pipe line construction industry. Tasks in the chemical industry require essentially the same technical standard.

One main objective is the construction of the petroleum pipe line for the large petroleum imports from the U.S.S.R. This includes the section 300 km. long in D.D.R. territory, as well as the section in the Polish Republic. The increasing need for underground supply lines requires an extensive mechanisation of pipe manufacture and pipe-laying.

The construction of pipe line installations for the first atomic power station must be carried out on the basis of Soviet experience.

Development and production of non-metal pipe lines does not come within the scope of power machine construction.

4.103 technical development

technical development includes the 25X1 carrying out of 100 complex items of research and development. Of these 87 items are to be completed by 1965 and 13 after 1965.

<u>Year</u>	<u>Number of items to be completed</u>
1960	16
1961	20
1962	11
1963	12
1964	6
1965	22
after 1965	13
	<u>100</u>

In addition, work will be carried out on a further 30 items in the field of basic research for continued development of the products of power machine construction.

4.11 Standardisation

The tasks to be carried out by 1965 in the sphere of standardisation are classified according to the main products concerned. In the list of /items,.....

**SECRET**

# SECRET

- 20 -

items, plans for research, development and construction, as well as specialisation have been coordinated within the framework of reconstruction.

## Steam generators

In steam generator construction, individual methods have hitherto prevailed, and this brought a larger number of standards into use, but did not suffice for attaining an advanced technique of production and specialisation. The basic parameters must be restricted as a prerequisite for a considerable reduction in the number of type variations. Where before standardisation there were 23 different grades of pressure and 31 of temperature, after the most recent revision a reduction <sup>to 7</sup> /grades of pressure and 8 of temperature has been obtained. The power grades have been reduced from 180 to 25.

Standardisation of types of boilers, grate firing, powdered fuel firing and oil firing, is now in the foreground. In this, overlapping in the different grades of performance as regards methods of construction must be avoided. Standardisation of construction equipment must be based on standardisation of types, and where this is not yet possible, due to the stage of development reached, it applies to standardisation of construction assemblies and units.

Standardisation of equipment is to be carried out for small boilers of 0.2 to 6.5 t/h capacity, and this will determine all details of construction down to techniques of manufacture. Standardisation of equipment is also to be arranged for oil-fired water pipe boilers with natural circulation up to 12.5 t/h capacity. The extent of the economic advantage of standardisation is shown by the example of a small water pipe boiler of 3.2 t/h capacity. After development of one type from 6 existing ones, and further development to standard equipment, a saving of about 50 TDM per boiler was achieved in small scale manufacture.

Specialisation of the production industry for large steam generators is made possible by standardisation of construction assemblies, such as drums, accumulators, nests of boiler tubes for water pipe boilers and steam superheaters.

Further standards of equipment are to be worked out for firing, flue gas-feed water preheaters and air heaters.

# SECRET

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### Steam turbines and generators

Production of steam turbines and generators has been carried out since 1945 according to specifications which were laid down according to the basic parameters valid in Germany at the time. For condensing turbines between 1.6 and 12.5 MW there were 6 grades of pressure, 6 of temperature, and 15 of performance. The standardisation of work consisted mainly in the setting up of standards of work for construction assemblies and units. A careful working out of basic standards has enabled the grades of pressure and temperature to be reduced at times by 5, at 10 degrees of output between 1.6 and 200 MW. The number of types of condensing turbines was thereby reduced from 21 to 10. Similar reductions in the number of types are being made in the case of reactor and bleeder condensing turbines. In contrast to the construction of steam generators, a standardisation of equipment is not yet possible. The endeavour to standardise construction assemblies is therefore all the greater. The number of glands is being reduced from 60 sizes to 45, and the sizes of external bearings are being reduced from 12 to 6. Of 14 rotary swivel heads, only 7 are being retained. For small turbines, only 2 types of bearing housing are to be used for 9 types of turbine. Through this standardisation, a considerable increase in quantity output is achieved, and centralised production of these assemblies is made possible.

### Gas turbine plant

In construction of gas turbine installations, standardisation will not come into full operation by 1965, as by that time too few installations will have been built. The main emphasis in standardisation is being concentrated on establishing basic principles for gas turbine installations (wiring circuits, turbine inlet temperature, efficiency in output, etc) and for parts of GT-installations, such as gas turbines, compressors, combustion chambers, etc.

Standardisation of construction assemblies and units is being carried out in accordance with the plan for steam turbines and generators, so that they can be used for gas turbines as well as steam turbines.

### Current transmission

The present state of development of current transmission and drive permits its use now for several customers. In order to prevent in advance all

## SECRET

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# SECRET

- 22 -

unsystematic construction, as a first requirement, line constants and construction series are to be set up. From the beginning, the total requirement will be covered by the smallest possible number of types. By a systematic building up of types, assemblies and individual parts will be so constructed that they can be used again in other sizes of construction.

## Water purification plant

In working out plans for water purification plant, Price Order No. 824 was taken into account, whereby a certain clearing up of types resulted. Further standardisation arrived at a 50-year restriction on the available choice. In addition, a comprehensive standardisation of equipment is being carried out, including reactor, filter and thermal installations.

## Pipe line plant

In pipe line construction, a considerable reduction in choice of pipes will be made, in agreement with the consumers. Basic parameters will also be established, and considerable restrictions will be introduced in construction elements. Where formerly there were Hanburg curved pipes with 4 radii of curvature, they will be replaced by Bitterfeld curved pipes with one radius of curvature. With segment curves, only 2 radii instead of 4 will be permitted. On fixed point and sliding bearings a 20 % economy in manufacture will be achieved through standardisation measures. For supports only one unit of height is provided for instead of 2 as hitherto.

## 4.12 Organisation of technical and scientific co-operation

### 4.121 Organisation in the sphere of research and development:

At present planning and execution of the work of research and  
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development is taking/essentially in three works: -

ZEK steam generators, Berlin-Wilhelmsruh, for steam generators

ZEK Turbines and Generators, Berlin-Wilhelmsruh, for steam turbines and generators

ZEK Research and Experimental Institute for current producing machines  
Dresden:  
for gas turbine installations  
current drive  
current transmission  
exhaust-driven turbo-superchargers  
water turbines

Furthermore there is the BEK-line for pipe lines, Bitterfeld, and there are BEKs and BK in all production branches of the power machine

# SECRET

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# SECRET

construction industry. The centralisation of BEKs for water purification installations will be carried out in 1961.

Although an adequate demarcation of the spheres of work of all F- and E-locations has been made, there is still no authorised and competent organisation for the coordination of this work, for the stricter observance of economic interests, and for scientific cooperation within the D.D.R. and with friendly countries. For carrying out these tasks and expediting technical and scientific progress as from 1.1.1961 an Institute for this branch of industry will be formed. The body responsible for this will be the Institute for Research and Experiment on Current-producing machines, of Dresden, which will hand over the development of gas turbines, current drive, current transmission and exhaust-driven turbo-superchargers to the appropriate ZEKs or DEKs.

Two main tasks are facing the new technical and scientific centre, namely:- the organisation of technical and scientific progress in power machine construction on the basis of the attached programme of technical development up to 1965; and carrying out special research work, especially on basic lines.

As a preliminary step towards this future development as from 1.7.1959 a department for "technical and scientific cooperation" will be formed within the institute for research and experiment on current-producing machines, and the institute will then become the technical and scientific centre of this branch of the industry. This department will be charged with effecting technical and scientific progress in power machine construction in all branches, in accordance with the economic interests of the industry, and on instruction from the direction of this branch of industry, it will also guide, coordinate and control the activities of the central and the factory F- and E-locations.

#### 4.122 Technical and scientific cooperation

In view of the extensive political and economic importance of F- and E-works, technical and scientific co-operation, both within the D.D.R. and with institutes and specialists in friendly foreign countries, is of exceptional importance.

The existing arrangements are shown below, with any necessary alterations for the purpose of augmenting the work.

**SECRET**

**SECRET** CONTROL  
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# SECRET

- 24 -

## Within the VVB power machine construction industry:

There are the working departments of "turbines" and "steam generators", with corresponding working groups and temporary study groups. The "pipe-lines" working department is at present being reorganised on the basis of the altered allocation of tasks.

## With other branches of industry:

Good co-operation has long existed with the:

Central Institute for welding technique, Halle  
" " " foundry practice, Leipzig  
" " " the technique of bearings, Leipzig  
Iron research institute, Hennigsdorf

There is also close co-operation with the branch of industry concerned with diesel engines, pumps and compressors.

Relations with the aircraft industry are at present still unsatisfactory. Existing objections to cooperation must be overcome shortly.

## With technical schools and colleges

For years there has been good cooperation with technical schools and technical institutes, especially with the:

Technical high school, Dresden	
Institute for thermodynamics and thermal electric machines	Prof. Faltin
Institute for applied electricity	Prof. Albring
Institute for the technique and industry of heating	Prof. BOLE

Cooperation is achieved by the above professors working together in the existing working departments, and by undertaking research assignments through the Institute.

Cooperation with the Mechanical Laboratory of the technical high school in Dresden in the field of gas turbines is at present unsatisfactory, and must be improved immediately.

## In Research Groups

At the beginning of 1959 two research groups were formed:

Peak-load gas turbine drive installation MW  
Free-piston gas turbine drive installation for the FDGB-tourist ship.

Cooperation is also proceeding in the "mineralised carbon" (Salzkohle)

Further research groups will shortly be formed outside the power machine construction industry, such as:

Air condensation and cooling towers  
Hydrogen cooling of turbo-generators

in which competent cooperation is to result.

# SECRET

9863

# SECRET

- 25 -

## International technical and scientific cooperation

At present cooperation is being effected in three ways:

consultation and passing over of documents and information, on the basis of a TWZ decision of the Permanent Commission for International Cooperation.

consultation and passing of documents and information on the basis of a decision on direct mutual cooperation between two research groups based on plans drawn up for work.

consultations on conferences of the working groups in the heavy machinery construction section of the RgW, and taking of decisions on coordination or specialisation of research and development work.

The results of work on the lines mentioned are as yet very unsatisfactory

## Measures for improvement

Formation of a responsible department within the technical and scientific centre or in the department of technical and scientific cooperation of the Institute for Research and Experiment, with the following principal objectives:-

Coordination of all subjects proposed by industry with the plan for research and technology and the technical and economic objectives of the industrial branch.

Execution of proposals and the programme of work for direct mutual cooperation with the State Planning Commission .

Thorough preparation of study tours by working out detailed programmes of work

Thorough evaluation of information collected on study tours and from documentation received.

Implementation of proposed liaison by means of direct mutual cooperation

Realisation of effective direct mutual cooperation between the research and development centres of the power machine construction industry and corresponding institutions in friendly countries abroad.

## 4.123 Standardisation

The work of standardisation hitherto carried out has been concentrated in too small measure on tasks with the aim of increasing productivity. In addition, the standardisation plan has not been harmonised sufficiently with the plan for research and development, and in the new development of machines and equipment there has been a general failure to consider possibilities for standardisation. The choice of subject was made almost exclusively by the workers directly engaged in standardisation. The working out of proposals was based to far too small an extent on cooperation of wide circles in industry.

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- 26 -

In order to improve the work of standardisation, it must be carried out on a basis of scientific and technical cooperation. With this end in view collective standardisation groups must be formed in all industries, composed of standardisation engineers, constructors, technicians and quality checkers, as well as workers from the planning, material supplies, and sales departments. The duties of the collective groups include cooperating in working out proposals and furthering the study and application of standards. In the first place, when working out standards, those within the limits of an industry should be aimed at, since practical economic application can then be effected directly by the administration of the VVB power machine construction industry. In further development the national standard is the aim.

Cooperation between the centres of standardisation must be further improved in order to achieve greater coordination in work and stricter control, and a superimposed coordination department is therefore necessary to ensure balanced development with other branches of industry. As standardisation is a component part of the work of technical and scientific cooperation, the FVAS takes over its regulation, coordination and control and in this connection the economic aim of the work has to be kept in the foreground. This activity is carried on in close cooperation with the heads of the centres.

#### 4.13 Demands of research and development on other branches of industry

Production and development in the power machine construction industry demand supplies of products from numerous other branches of industry and therefore require corresponding development in the factories and institutions of these branches. Demands on other industries in the shape of research and development known to be needed at present have been collated and communicated to the other branches concerned. Control and integration of these requirements in development is being dealt with currently under coordination by the FVAS.

Problems awaiting solution in the branch of metallurgy are of special importance.

Further development in the direction of a higher thermal working grade is only possible if the temperatures of steam power plant and gas turbine

# SECRET

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9853

# SECRET

power plant can be further increased. The necessary developments in material are to be speedily carried out. Metallurgical development must be coordinated with technical and mechanical development, and the power machine construction industry must make clear to the metallurgical industry its technical demands as regards the materials it requires. It must extend its support to metallurgy for long-term testing of heat-resistant materials and carry out its own special investigations under near-operating conditions; before it is used in production, every new heat-resistant material must be submitted to comprehensive long-term testing, as well as to a systematic investigation in respect of technological properties.

In principle the power machine construction industry will in future initiate the development of new heat-resistant materials. It will submit to metallurgists a plan of development and in conjunction with the metallurgical industry decide upon and carry out the investigations. For solution of these problems within the Institute for Research and Experiment on Electrical Machines, an already existing department of materials will be gradually extended.

Working out of the materials required by the power machine construction industry up to 1965 and of the development work to be undertaken by metallurgy has already been completed and handed over to the authorities as a basis for the plan in prospect for development of heat-resistant materials up to 1965.

#### 4.2. Measures for specialisation, concentration and centralisation of production

Specialisation, concentration and centralisation of production form the decisive basis for rapid development of production and activity in the industry, proceeding from the anticipated research and development which is of use above all in increasing productivity among customers for power plant machinery by means of extensive standardisation of products. These measures represent the nucleus of socialist reconstruction in the power plant machine construction industry.

#### 4.21 Anticipated form of organisation in the industry

The measures foreseen for specialisation, concentration and centralisation of production demand reorganisation of the industry, and especially establishment of leading concerns and chief contractors

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# SECRET

- 28 -

## Steam generators

The exclusive manufacturer and contractor for small steam generators (coal-fired up to 6.5 t/h steam, oil-fired up to 12.5 t/h steam) will w.e.f. 1963 be the VEB pre-heater and boiler-construction works, Gothen. Its tasks will include planning, construction, production, assembling and initiating operation, for which it will be entirely responsible.

The chief contractor for large steam generators (limits fixed in conjunction with small steam generators) will be the VEB large steam generator construction firm, Berlin, which is to be reconstructed from the present ZEK steam generator concern by 1.1.1963. This is the only vendor of complete large steam generators (including furnace) in the D.D.R., and it carries out planning, construction, assembling and putting into operation. Production takes place in the specialised factories in this branch of production. The VEB large steam generator construction concern will be the only contractor for large steam generators for:

VEB steam boiler construction, Meerane  
 " " " " Hohenturm  
 " preheater and boiler construction, Kothen  
 " Central German furnace construction, Holzhausen  
 " furnace construction, Greiz-Dolau  
 " machine- and steam boiler construction, Gera

The VEB large steam generator construction firm will also be the leading concern for the entire steam generator construction industry factory group, where coordination and control of technical development, as well as economic activity and production are concerned.

The only manufacturer and contractor for ship's and special boilers is to be the VEB machine and steam construction works at Gera, w.e.f. 1963. It is to carry out planning, construction, production, assembling and putting into operation of these products.

In addition, from 1960 onwards, a principal repairs centre is to be set up at the VEB boiler construction concern, Neumark. Its work will be to distribute all orders for repairs to large steam boilers to the following concerns:

VEB boiler construction concern, Neumark  
 Carbon extraction company, Zeitz  
 German Babcock & Wilcox Works, AG Halle

# SECRET

**SECRET CONTROL**  
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9803

# SECRET

- 29 -

## Turbine and generator construction

In this branch of production, measures are being concentrated in principle on centralisation of production of assembly groups and single parts, not involving any significant change in direction and organisation. The leading role in the field of technical development of this branch of production remains with ZEK Turbines and Generators.

## Water purification plant

In this branch of production, the VEB Water purification plant construction firm at Markkleeberg is to be the main contractor for complete water purification plant. It will carry out all research, development and standardisation tasks, planning, assembling and putting into operation. Where these contracts involve construction work for thermal water-processing plant, it carries them out within the range of its capacity. It distributes orders to the following works according to the available capacity:

VEB steam-boiler construction, Dresden-Ubigau  
 " water purification plant construction, Aschersleben  
 " " " " " Rathenow

and to firms under other administration and ownership. As chief contractor it takes full responsibility for carrying out the contracts. The VEB water-purification plant construction firm, Markkleeberg, assumes at the same time the leading role in technical development, as well as the production and economic activity of all centrally administered and local factories in this branch of production.

## Pipe-line construction

The formation and appointment of a chief contractor will come up for consideration with the creation of a central assembling works at the VEB pipe-line construction concern, Bitterfeld, w.e.f. 1.1.1963. Until then, w.e.f. 1.1.1960, the VEB pipe line construction concern, Bitterfeld, will be appointed the leading concern for this entire branch of industry. Its sphere extends to include also pipe line construction works under other administration and ownership. It comprises above all regulation of contracts for all factories, without the concern being the chief contractor, the apportionment of requirement for pipe lines, specialised and technical guidance for all factories, as well as standardisation for all concerns.

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In this context it is anticipated that the VEB pipe line construction works, Karl Marx Stadt, and the assembling section of the VEB pipe line and equipment construction works, Pinow, will be affiliated to the Bitterfeld pipe line works, the former on 1.1.1961, and the latter on 1.1.1963. These measures are being furthered by the DEK pipe line control already set up in the VEB pipe line construction concern, Bitterfeld, which has the urgent task of giving technical and scientific guidance and advice to the factory construction bureaux in the field of the pipe line construction industry.

A common socialist industrial association of the following concerns:

VEB pipe line construction, Bitterfeld  
 VEB pipe line and equipment construction, Pinow  
 VEB pipe line construction, Karl-Marx-Stadt

will make the point still clearer as to whether the centralised assembling section of the VEB pipe line construction, Bitterfeld, is to be constituted from 1963 onwards as a legally independent concern and chief contractor for the whole of pipe line construction.

## 4.22 Programme for specialisation, concentration and centralisation of construction groups

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These measures have as their object extensive transition from single-part production methods employed hitherto to continuous and serial production and at the same time diversion of products which are not part of this branch of industry into the industries to which they belong.

### Steam generator construction

The earlier demarcation of the production programme into sections according to size of output failed to take into account the fact that continual balancing of concerns, on the basis of fluctuating demand for individual sizes, could not be guaranteed and the limits so firmly laid down had continually to be overstepped. In addition, it was not taken into consideration that the production of complete steam generators in any factory required the formation of a large number of construction groups with widely differing technological conditions, making for a large number of divergent/technological processes in every factory with a relatively small volume of production, involving a very wide selection of types of machinery, but without full exploitation of individual machines. In spite of the complicated management structure of the concern, preparation, direction and control of production were difficult to carry out under the existing

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<sup>31</sup>  
**SECRET**

demarcation according to the output capacity of the generators. It is therefore proposed that concerns should specialise in setting up similar kinds of technological groups in larger numbers. The construction programme for steam generators will then be organised as follows:

VEB steam generator construction, Meerane, will specialise in production of large steam generators, including ladders and plat forms, as well as metal plating, standard parts, hot-press parts and iron parts for walling in. The whole of production still in hand, including accumulator construction and drum manufacture, will be transferred to the specialised concerns.

VEB steam boiler construction, Hohenthurn is to specialise in production of drums, accumulators and pipe-bending (pressure plates) for large steam generators, with drum production for plant up to 220 t/h steam. Drums for steam generators over 220 t/h will be imported. The remaining production, such as oil furnaces, supporting framework, boiler repairs, assembling, boiler conversion and tank construction must be diverted from this concern.

Assembling and putting into operation of large steam generators are to be carried out by the VEB large steam generator construction concern under its own control.

The Central German furnace construction concern, Holzhausen, is to specialise in production of furnaces for powder-form fuel. The remaining production, such as trough-grate heating appliances, assembling, and putting into operation, as well as hydraulic ash removal equipment will be redistributed inside the industry, while the branch of industry existing for these purposes is to be given up.

The VEB furnace construction concern, Greiz-Dolau, is to specialise in production of heating appliances for solid fuels and drag conveyor ash removal. In addition, it will also specialise in standard castings, such as entrance hatches, explosion and observation doors, as well as ash funnel covers and sliding covers for bunkers. To reduce the assortment of products, production of air preheaters and motor grabs is to be redistributed inside and outside the industry within the specialisation framework. Assembling is to be transferred to the VEB large steam generator construction works and the VEB preheater and boiler construction works, Kothem.

**SECRET**

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**SECRET**

- 32 -

The factory will however continue to maintain a repairs section including an assembling group for carrying out repairs to grates for large steam generators.

In production of furnaces for solid fuels and powder-form fuels, specialisation is to take place between the Central German furnace construction works and the furnace construction works, Greiz-Dolau. Furnaces for liquid fuels required in steam generator construction will be centralised exclusively for assembling in the VEB machine and steam boiler construction concern, Gera, which is also taking over the production of ship's and special steam generators. As production of oil furnaces is at present still in progress, it is desirable that in the meantime this work should be counter /balanced by other production. The concern will therefore take over production of boiler gas, coal dust and air-regulating mechanism from the VEB steam boiler construction works, Dresden-Ubigau. Production of bottle-washing machinery, which is a separate line, is to be retained for the present but reduced as oil furnace production increases. Production of high-pressure small steam generators, cross-tube boilers, extractors, compressed air piston pumps and tanks is to be disposed of both inside the specialised firms in the industry, and also outside the industry.

The VEB preheater and boiler construction works, Kothen, is the chief contractor for high-pressure small steam generators up to 6.5 t/h steam for solid fuels, and up to 12.5 t/h steam for liquid fuels. The works is responsible for the technical development of these steam generators, including production, assembling and putting into operation, as well as the corresponding heating appliance assembly. Certain links are in existence with the VEB furnace construction works, Greiz-Dolau, to guarantee development and production of standard furnace grates. The extension of production zones required for specialisation purposes will be achieved by taking over the Markkleeberg industrial area - branch works Kothen - (the former firm of Elsternmann). In addition to production of small steam generators, the works will specialise in production of plate and tube air heaters and ribbed steel piping (Kess) for which the VEB large steam generator construction concern is a customer. In addition to new production of the selection of products mentioned above, the firm is responsible for

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carrying out necessary repairs and deliveries of spare parts. This applies equally to previous production and to the lines taken over from the VEB Karl Liebknecht heavy machine construction works, Magdeburg, the VEB steam boiler construction works, Dresden-Ubigau and the VEB steam boiler construction concern, Hohenthurn. The production of wrought-iron low pressure boilers, coaling plant and tanks is to be diverted to other works outside this branch of industry.

Under the scheme of specialisation of production according to construction groups in steam generator construction, and of establishing chief contractors for large steam generators, small steam generators and ship's and special purpose generators, all repairs and rebuilding of large steam generators over 12.5 t/h steam are being taken away from the concerns and transferred to the control station for repairs to these boilers at the VEB boiler construction concern, Neumark. Repairs and rebuilding of small steam generators are to remain at the VEB heater and boiler construction concern, Kothen. With specialisation as chief contractor for repairs and rebuilding, the VEB boiler construction works also takes over workshop production for guarantee deliveries, and all construction work required for repairs and rebuilding is to be carried through. The same applies to production, assembling and putting into operation. For carrying out the complete repair and rebuilding   on a national scale, the Zeitz 25X1 Trustee Coal -extraction company and the German Babcock & Wilcox Works AG Halle are available. The distribution of work to the associated factories comes directly from the VEB boiler construction works, Neumark, with at the same time offers of any assembling equipment required. The equipment remains the property of the VEB boiler construction works, Neumark, with which loan contracts must be signed. Evaluation of cases of damage occurring is to be undertaken in close cooperation between the VEB boiler construction concern, Neumark and the VEB large steam generator construction works and the findings borne in mind for research purposes and in planning and designing new equipment. Tank production included in the present production programme will be continued as supplementary production.

Karl Liebknecht

The concerns VEB/heavy machinery construction works, Magdeburg

VEB Bergmann-Borsig

VEB steam boiler construction, Dresden-Ubigau

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- 34 -

are to discontinue production of steam generators completely from 1965.

Resources thus liberated will be turned over to production of chemical

armament, parts for nuclear plant and equipment for water purification plant,

Turbine and generator construction

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The concentration and centralisation [ ] is directed in this branch towards construction groups and single components. [ ]

[ ] The most important projects are the following:

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Coordinating production of blades according to form and size in the Bergmann-Borsig Works, the Gorlitz machine construction concern and the turbine factory, Dresden. This standardisation will achieve a reduction in materials and assembling time and improved distribution of the available equipment.

Centralisation of machine-less blade production in the VEB Works, Ludwigsfelde. This will involve a saving in equipment, a reduction in assembling time through the introduction of large production lines, and a real economy of material.

Centralisation of production of cast nozzle caps in the VEB machine construction concern, Gorlitz, will achieve better use of special foundry equipment, saving in special apparatus, improvement of the quality and reduction in production time.

Central production of entrance bucket covers in the VEB turbine factory Dresden, making possible real economy in equipment, reduction in production time and improvement in quality.

Central production of circular bearing bushings in the Gorlitz VEB machine construction works, with consequent increase in quantities produced and reduction in production and assembling time

Central organisation of assembly-regulating for the whole of turbine construction in Works II of the turbine factory, Dresden. This makes it possible after standardisation of this construction section to make use of production experience already amassed at the Dresden factory, to distribute special purpose machinery and means of production to better advantage and to economise in production time and improve the quality of precision components.

Concentration of production of superheated steam screws in the VEB Demphy concern, Magdeburg; this will relieve the strain on the extremely reduced capacity for production of small mechanical components at the turbine factory and reduce cost of production.

Concentration of production of air condensers at the VEB machine construction works, Gorlitz; bringing better use of available equipment by a higher rate of piece production and better exploitation of production surface, reducing the cost of production.

In addition to these measures, there are the following existing production concentrations:

Generator production up to 25 MW at the VEB Sachsenwerk Niedersiedlitz  
 " " over 25 MW at the VEB Bergmann-Borsig  
 Gas turbine production for all sizes at the VEB machine construction works, Gorlitz  
 Current transmission machinery for railway engine construction, at the VEB turbine factory, Dresden.

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- 35 -

## Water purification plant

In this branch of production, specialisation according to equipment and construction groups will be introduced from 1.1.1961, and reasons similar to those operative for steam generator construction are also decisive in this case.

Specialisation includes the following important measures:

Organisation of a central assembling works w.e.f. 1.1.1961 for assembling and putting into operation, constituted by the VEB water purification plant construction concern, Markkleeberg, which is also the chief contractor. The conditions for specialised production will be created at the production concerns by concentration of assembling capacity. Centralisation of the process of putting into operation will facilitate technical procedure and ensure that tasks are carried out.

There is resultant specialisation of certain sectors of construction for water-purification plant at the VEB steam boiler works, Dresden-Ubigau, involving simplification of previous fragmentation of production at this works. Reorganisation is to be carried out by 1964.

## Pipe line construction

The following measures are foremost in centralisation of this industry:

Concentration of production of welded pipes in the VEB pipe line construction concern, Bitterfeld, from 1964 onwards, together with completion of the new pipe-welding works to be built and continuation of production of oil pipe lines.

Production of bends (plain pipe, curved pipe, Bitterfeld bend, etc) in the pipe line construction works, Bitterfeld, and pipe line and equipment construction works, Pinow; production of plain pipe and curved pipe bends from seamless welded piping will be centralised at the VEB pipe line and equipment works, Pinow, and Bitterfeld bends and curved pipe bends from welded piping at the VEB pipe line construction concern, Bitterfeld.

Production of shaped parts and segment bends is to be centralised at the VEB pipe line construction concern, Bitterfeld.

Production of standard parts for pipe line construction (section points, friction bearings, etc) will be centralised at the VEB pipe line construction works, Bitterfeld.

## 4.23 Anticipated shift of production outside the framework of the industry

[Redacted]

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For conclusion of agreements with erstwhile partners, dates and liabilities have been fixed, where this agreement has not yet been carried out.

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## 4.3 Measures for altering production technique and factory organisation

The measures for far-reaching standardisation, specialisation and concentration of production create the conditions for improvement and simplification of production technique and factory organisation.

### 4.31 Development of the single-component, small series and serial production sector

Specialisation in assembling and equipment in steam generator, water purification plant and pipe line construction, as well as centralisation of assembling and production of single components in turbine and generator construction lead to a significant rise in the number of similar or identical products in power machine factories, with a simultaneous reduction in variety. The extent of single-component production will be reduced from 75 % in 1958 to 46 % in 1965, while the extent of small series and serial production is considerably on the increase.

	Single component %	Small series %	Serial production %
VVB total	46.0	43.0	11.0
Steam generators and turbine construction	50.0	50.0	-
Generators	60.0	31.0	9.0
Water purification plant	69.0	31.0	-
pipe line production	15.0	50.0	35.0

This development makes possible both an increase in productivity up to 1965 and a reduction in overloading of preparatory sectors for production, such as construction, technology and material supply, so an increasing number of tasks can be carried out with a reduced number of employees.

### 4.32 Development of supply, structure and exploitation of means of production

The anticipated concentration and specialisation of production requires reorganisation of the whole construction programme in individual factories.

The necessity then arises of adapting the supply and structure of means of production to the new technological conditions. This necessity is not fully evident in the reported requirements for equipment and in the anticipated conversion of machinery in accordance with the proposed plan

since the factories are not in all cases able to ascertain the new technological conditions in detail. Provision is therefore made for examining the distribution of the requirement for new equipment to the factories and conversion of machinery carefully up to the end of 1959 and

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adapting it to demands.

In this connection it is to be laid down in detail as to how, by concentration of new investment of machine tools in turbine and generator construction, machinery which is quite fit for use can be transferred from this branch of production to others, so that the efficiency of the new investment policy, by comparison with the former one, will be considerably increased.

By adaptation of equipment to the new technological conditions of specialised production, exploitation of means of production will show an increase up to 1965 by comparison with 1958:

	Shift coefficient	Exploit- ation of machines M/cm	Exp. of Prod. surface	1965 % to 1958
VVB total	1.5	68.0	3025	187.0
Steam generator construction	1.5	65.0	3900	265.0
Turbine and generator construction	1.6	72.5	2390	143.5
Water purification plant	1.5	55.0	1710	155.0
Pipe line construction	1.4	75.0	3960	147.0

The improved use made of production surface is dependent, especially in the steam generator and pipe line construction industries, among others, on the bringing into effect of the planned investment in construction as a prerequisite for a significant improvement of the technological process. When the requirements for equipment already mentioned have been met, the efficiency factor of machine tools will be improved on an average 2.2. and the average working life will be reduced to 12 years.

The detailed survey of development of the condition and structure of means of production will be extended up to 31.7.59.

## 4.33 Development of production methods

When the anticipated standardisation, specialisation and concentration has been achieved, it will be possible to make extensive use of modern production methods, since the expensive and valuable machinery and equipment required for it are then profitable on the basis of a high production output.

In particular, introduction of the following production methods is foreseen:

Shielded arc welding for circular beads on pipes, tanks and equipment(flanges)

Electric arc welding (lit. "slag" welding) for thick plating for boiler drums, collectors and pipes

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- 38 -

Magnetic zone welding in assembling long-distance pipe lines

Necking out and pressing out (moulding?) collectors and shaped parts for steam generators and pipes

Broader introduction of unit and group assembling in steam generator construction, water purification plant and pipe line construction, combined with increased mechanisation of working processes and transport to assembly lines

Non-destructive testing of materials by using isotope testing, spectrum analysis and combined testing process - sonic and X-ray -;

Manufacture of non-machined profiled turbine blades by the processes of precision pressing, continuous pressing, rolling and drawing, as well as precision casting;

Machining of blades and their bases with modern high-efficiency copy milling machines;

Abolition of hand grinding and polishing of blades by substitution of modern high-efficiency copy milling machines

Change over to welded construction for exhaust steam chambers, distributors and low-pressure turbine rotors;

Machining of housing sections, and parts with complicated outlines on vertical lathes and boring mills with copy attachment, and, as far as possible machines with preset course

Abolition of manual scraping of sealing surfaces of casings by substitution of special scraping machines

By a further series of measures involving using induction heating, introduction of proved newer methods and standardisation of appliances and tools, a further improvement in methods will be brought about.

The measures have been laid down in detail in the industrial reconstruction programme.

#### 4.34 Development regarding labour and personnel

It appears from Appendix 9 that the number of employees, in accordance with the provisions of the State Planning Commission shows a tendency to decrease, while there is a simultaneous increase in the proportion of technical and industrial school personnel.

Entry of graduates from colleges and technical schools must be encouraged to a much greater extent for training and for supplying technological sections, production management and standardisation bureaux of factories.

Far-reaching specialisation in the production plan demands wider specialisation in training in different fields at colleges and technical schools.

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**SECRET**  
- 39 -

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On the other hand, the complex character of training must be guaranteed by providing that each engineer should have an adequate grasp of economic data specially related to industry, and that each economist should have sufficient knowledge of basic technical data. It is also desirable for average management personnel, heads of departments and foremen should qualify in technical and economic training so that they can meet requirements adequately as organisers of production.

In power machine construction, short-term measures must be taken for training highly skilled fitters and welders for building very high-pressure power plants and nuclear power plants. Similar training measures must be introduced for training fitters to go abroad and personnel to put plants into operation.

#### 4.35 Development of factory organisation

By cutting down the number of products in the industry, it will be possible to go over to a greater extent than hitherto from production on the workshop principle to production based on the flow of material in all plants in the industry. Measures to this effect will be carried out in the next few years within the framework of the reconstruction. The main objective must be to strengthen the foremen's and heads of sections' resources and responsibilities as production organisers. In the transition period, group production will shortly be introduced to a greater extent.

In the field of materials and storage, measures for centralisation of the facilities required are foreseen, in order to put an end to fragmentation, increase control and shorten transit time for materials and production. A desirable economy must thus be effected in means of circulation, to be used for financing serial production of single parts within the framework of storage contracts.

By the introduction of a card-punching system, [redacted]

[redacted] planning and accounts have been simplified. Improve- 25X1  
ment of factory and administrative organisation must be combined with a considerable simplification of management structure, on the basis of the specialisation in production which is proposed. Individual proposals have been submitted under the reconstruction programme which are to be evaluated by the VVB power machine construction industry. The aim of these measures

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is to guarantee reinforcement of the numbers in technical sections, with an <sup>other</sup> 25X1  
 overall reduction in/personnel. Special emphasis is to be laid on working  
 out long-term tasks by technological planning. A considerable part of  
 construction capacity must in future be used for standardisation objectives.

5. Advantages of the reconstruction measures and funds for their  
 implementation

The advantages [ ] for the electric power 25X1

machine construction industry will include first of all:

An increase of production in the industry to 194.0 % up to 1965, as  
 compared with 1958;

An increase in productivity to 200.0 % up to 1965, by comparison with  
 1958

A decrease in costs to 66.8 % in 1965, as compared with 88.5 % in 1958

A rise in profits from 45.6 million DM in 1958 to 370.0 million DM in 1965

An increase in efficiency and reduction in specific weight for the main  
 products of the power machine construction industry, whereby the  
 advantage achieved would be felt by the industry's consumers.

The exact sum of the economies achieved by means of socialist reconstruc-  
 tion in the power machine construction industry amounts to 83.2 million DM  
 in the period from 1960 to 1965. As against this, the VVB power industry  
 will make a financial demand on the economy of 44.8 million DM in the same  
 period for the financing of standardisation measures, in so far as these are  
 not covered by amounts earmarked for the purpose in the framework of the  
 Financial Plan.

The requirement for investment, and in particular the amount in  
 excess of the forecast of the State Planning Commission in the years 1960-1961,  
 will be based on the accelerated increase in production in relation to the  
 advance figures of the State Planning Commission in paragraph 3, [ ]

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In this connection, [ ] it appears  
 that in the period from 1960 to 1965 the VVB power industry will only employ  
 4.12 % of the sum allocated to it on general overhaul and supplementary  
 investment in order to be able to finance the major part of the reconstruc-  
 tion measures, including fire-, factory- and workers' protection out of the  
 sum allocated, and relieve the demand on the economy.

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On these grounds, socialist reconstruction in the industry will begin  
 to take effect immediately.

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